WHAT IS CLAIMED IS:

1. A method of manufacturing a photoelectric conversion device comprising the steps of:

disposing a metal containing layer in contact with an upper or lower surface of a non-single crystalline silicon semiconductor layer;

crystallizing said non-single crystalline silicon semiconductor layer by heating wherein said metal functions to promote the crystallization;

forming a gettering layer on or within said semiconductor layer after crystallized, said gettering layer containing phosphorus; and

heating said semiconductor layer and said gettering layer in order to getter said metal contained in said semiconductor layer.

2. The method of claim 1 wherein said metal is selected from the group consisting of Ni, Fe, Co, Ru, Rh, Pd, Os, Ir, Pt, Cu and Au.

3. The method of claim 1 wherein said photoelectric conversion device is a solar cell.

4. A method of manufacturing a photoelectric conversion device comprising the steps of:

disposing a metal containing layer in contact with a non-single crystalline silicon semiconductor layer;

crystallizing said semiconductor layer by heating wherein said metal functions to promote the crystallization thereof;

forming a phosphorus doped silicon layer on said semiconductor layer after said crystallizing; and

heating said phosphorus doped silicon layer and said semiconductor layer.

5. The method of claim 4 wherein said non-single crystalline silicon semiconductor layer is formed on a substrate having an electrode and said metal containing layer is formed on an upper surface of said semiconductor layer.

6. The method of claim 4 wherein said phosphorus doped silicon layer contains phosphorus at a concentration of 0.1 to 10 wt%.

7. The method of claim 4 further comprising a step of etching a surface of said semiconductor layer after the step of heating said phosphorus doped silicon layer and said semiconductor layer in order to make the surface of said semiconductor layer uneven.

8. The method of claim 4 wherein said photoelectric conversion device is a solar cell.

9. A method of manufacturing a photoelectric conversion device comprising the steps of:

disposing a metal containing layer in contact with a non-single crystalline silicon semiconductor layer;

crystallizing said semiconductor layer by heating wherein said metal functions to promote the crystallization thereof;

introducing phosphorus ions into a surface of said semiconductor layer after said crystallizing; and then

heating said semiconductor layer.

10. The method of claim 9 wherein said non-single crystalline silicon semiconductor layer is formed on a substrate having an electrode and said metal containing layer is formed on an upper surface of said semiconductor layer.

11. The method of claim 9 further comprising a step of etching a surface of said semiconductor layer after the step of heating said semiconductor layer in order to make the surface of said semiconductor layer uneven.

12. The method of claim 9 wherein said photoelectric conversion device is a solar cell.

13. A method of manufacturing a photoelectric conversion device comprising the steps of:

disposing a metal containing layer in contact with a non-single crystalline silicon semiconductor layer;

crystallizing said semiconductor layer by heating wherein said metal functions to promote the crystallization thereof;

forming a phosphorus silicate glass layer on said semiconductor layer after said crystallizing; and

heating said phosphorus silicate glass layer and said semiconductor layer.

14. The method of claim 13 wherein said non-single crystalline silicon semiconductor layer is formed on a substrate having an electrode and said metal containing layer is formed on an upper surface of said semiconductor layer.

15. The method of claim 13 wherein said phosphorus silicate glass layer contains phosphorus at a concentration of 1 to 30 wt%.

16. The method of claim 13 further comprising a step of etching a surface of said semiconductor layer after the step of heating said phosphorus silicate glass layer and said semiconductor layer in order to make the surface of said semiconductor layer uneven.

17. The method of claim 13 wherein said photoelectric conversion device is a solar cell.

18. A method of manufacturing a photoelectric conversion device comprising the steps of:

forming a metal layer on a substrate;

depositing a non-single crystalline silicon semiconductor layer on said metal layer;

crystallizing said semiconductor layer by heating wherein said metal functions to promote the crystallization thereof;

forming a phosphorus containing layer on or within said semiconductor layer after said crystallizing; and

heating said phosphorus containing layer and said semiconductor layer.

19. The method of claim 18 further comprising a step of etching a surface of said semiconductor layer after the step of heating said phosphorus containing layer and said semiconductor layer in order to make the surface of said semiconductor layer uneven.

20. The method of claim 18 wherein said photoelectric conversion device is a solar cell.

21. A solar cell comprising:

a substrate;

a first crystalline silicon film having a substantially intrinsic conductivity type on said substrate; and

a second crystalline silicon film having one conductivity type adjacent to said first crystalline silicon film,

wherein said first crystalline silicon film contains a catalyst element for promoting crystallization of silicon at a concentration not higher than 5 x 10^{18} atoms/cm^3.

22. The solar cell of claim 21 wherein said catalyst is selected from the group consisting of Ni, Fe, Co, Ru, Rh, Pd, Os, Ir, Pt, Cu and Au.

23. The solar cell of claim 21 wherein a concentration of said catalyst contained in said second crystalline silicon film is higher than said the concentration of said catalyst contained in said first crystalline silicon film.

24. The solar cell of claim 21 wherein said first crystalline silicon film has a different conductivity type than said second crystalline silicon film.

25. The solar cell of claim 21 wherein said first crystalline silicon film comprises a plurality of crystal grains in the form of needles.

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